

INDEX TO VOLUME XIII, 1913

SCHOOL SCIENCE AND MATHEMATICS

A Journal for Science and Mathematics Teachers in Secondary Schools

Founded by C. E. Linebarger

CHAS. H. SMITH

EDITOR

Hyde Park High School, Chicago

CHAS. M. TURTON

BUSINESS MANAGER

Bowen High School, Chicago

DEPARTMENTAL EDITORS

ASTRONOMY—G. W. MYERS

University of Chicago

BOTANY—W. L. EIKENBERRY

University High School, Chicago

CHEMISTRY—A. L. SMITH

Englewood High School, Chicago

EARTH SCIENCE—C. E. PEET

Lewis Institute, Chicago

ZOOLOGY—WORRALO WHITNEY

Hyde Park High School, Chicago

MATHEMATICS PROBLEMS—E. L. BROWN

North Side High School, Denver, Colorado

MATHEMATICS—H. E. COBB

Lewis Institute, Chicago

PHYSICS—W. E. TOWER

Englewood High School, Chicago

SCIENCE QUESTIONS—FRANKLIN T. JONES

University School, Cleveland, Ohio

Published Monthly October to June, Inclusive, at Mount Morris, Illinois

Price, \$2.00 Per Year; 25 Cents Per Copy

SCHOOL SCIENCE AND MATHEMATICS

SMITH & TURTON, Publishers

Publication Office, Mount Morris, Ill.

CHICAGO OFFICE, 2059 East 72nd Place

Entered as second-class matter March 1, 1913, at the Post Office at Mount Morris, Illinois, under the Act of March 3, 1879

ASSOCIATE EDITORS

- L. D. AMES (*Mathematics*)
University of Missouri, Columbia
- M. A. BIGELOW (*Biology*)
Teachers College, Columbia University,
New York
- N. HENRY BLACK (*Physics*)
Roxbury Latin School, Boston, Mass.
- A. P. CARMAN (*Physics*)
University of Illinois, Urbana
- JAMES F. CHAMBERLAIN
(*Earth Science*)
State Normal School, Los Angeles, Cal.
- S. E. COLEMAN (*Physics*)
Oakland High School, Oakland, Cal.
- CLARENCE E. COMSTOCK
(*Mathematics*)
Bradley Polytechnic Institute, Peoria, Ill.
- R. H. CORNISH (*Physics*)
Wadleigh High School, New York City
- HENRY CREW (*Physics*)
Northwestern University, Evanston, Ill.
- E. W. DAVIS (*Mathematics*)
University of Nebraska, Lincoln, Neb.
- SAUL EPSTEIN (*Mathematics*)
University of Colorado, Boulder, Colo.
- GEORGE W. EVANS (*Mathematics*)
Charlestown High School, Boston, Mass.
- W. A. FISKE (*Physics*)
Occidental College, Los Angeles, Cal.
- MISS EFFIE GRAHAM (*Mathematics*)
High School, Topeka, Kan.
- JAMES W. GOLDTHWAIT
(*Earth Science*)
Dartmouth College, Hanover, N. H.
- F. E. GOODELL (*Physics*)
High School, Des Moines, Iowa
- J. E. GOULD (*Mathematics*)
University of Washington, Seattle, Wash.
- WILLIAM M. GREGORY
(*Earth Science*)
Department of Geography,
Normal School, Cleveland, Ohio
- WM. A. HEDRICK (*Physics*)
McKinley Manual Training School,
Washington, D. C.
- T. C. HOPKINS (*Earth Science*)
Syracuse University, Syracuse, N. Y.
- O. C. KENYON (*Physics*)
High School, Syracuse, N. Y.
- NICHOLAS KNIGHT (*Chemistry*)
Cornell College, Mount Vernon, Ia.
- C. A. LAISANT (*Mathematics*)
Paris, France
- A. J. MADILL (*Biology*)
High School, Fort Williams, Ont.
- THOMAS E. MCKINNEY (*Mathematics*)
University of South Dakota, Vermillion
- C. D. MESERVE (*Mathematics*)
Newtonville High School,
Newtonville, Mass.
- G. A. MILLER (*Mathematics*)
University of Illinois, Urbana, Ill.
- W. C. MORGAN (*Chemistry*)
Reed College, Portland, Ore.
- FRANK MORLEY (*Mathematics*)
Johns Hopkins University,
Baltimore, Md.
- LOUIS MURBACH (*Biology*)
Central High School, Detroit, Mich.
- LYMAN C. NEWELL (*Chemistry*)
Boston University, Boston, Mass.
- B. W. PEET (*Chemistry*)
State Normal College, Ypsilanti, Mich.
- E. C. PERISHO (*Earth Science*)
State University, Vermillion, S. D.
- E. J. RENDTORFF (*Physics*)
Lake Forest Academy, Lake Forest, Ill.
- D. C. RIDGLEY (*Earth Science*)
Illinois State Normal University,
Normal, Ill.
- H. S. ROBERTSON
(*Mathematics and Physics*)
Provincial Normal School,
Stratford, Ont., Can.
- FERNANDO SANFORD (*Physics*)
Leland Stanford University,
Palo Alto, Cal.
- E. P. SCHOCH (*Chemistry*)
University of Texas, Austin, Tex.
- ARTHUR SCHULTZE (*Mathematics*)
High School of Commerce, New York
- LEVI S. SHIVELY (*Mathematics*)
Mount Morris College, Mount Morris, Ill.
- R. L. SHORT (*Mathematics*)
West Technical High School,
Cleveland, Ohio
- DAVID EUGENE SMITH
(*Mathematics*)
Teachers College, Columbia University,
New York
- JAMES H. SMITH (*Earth Science*)
Austin High School, Chicago
- E. N. TRANSEAU (*Botany*)
State Normal School, Charleston, Ill.
- F. R. WATSON (*Physics*)
University of Illinois, Urbana
- C. T. WRIGHT (*Earth Science*)
John C. Fremont High School,
Oakland, Cal.

INDEX BY TITLES.

A

Academic Inefficiency, A Source of. ARTHUR E. HAYNES.....	584
Adjustment of the Common School Curriculum of the Vocational Needs of To-day. W. N. HAILMAN	382
Advanced Physics Work in the High School. An Experiment in Con- ducting. C. M. HALL	735
Agriculture in the High School. CARL F. KNIRK.....	306
American Federation. WM. A. HEDRICK	626
American Geometry in France. GEORGE BRUCE HALSTED.....	344
American Mathematical Monthly, An Announcement Concerning the. H. E. SLAUGHT	67
Arctic Flora, The Ancient. AMERICAN BOTANIST	764
Area of the Hyperbolic Spiral by Elementary Methods. OTTO J. RAMLER	346
Arithmetical Progression, Prime Numbers in. ARTEMAS MARTIN	793
Articles in Current Periodicals66, 155, 260, 353, 443, 539, 620, 737,	830
Association of Colleges and Secondary Schools in the Southern States, 1913 Meeting of the. BERT H. YOUNG.....	730
Astronomical Telescope, The. WINTHROP E. FISKE	419
Astronomy, An Exercise in Laboratory. J. E. GOULD	327
Automobiles and the High School. U. S. BUREAU OF EDUCATION.....	500

B

Back Numbers Wanted	844
Bedbug, The. JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION	636
Bibliography of the Teaching of Mathematics	445
Big Trees, The Secret of the	828
Biological Stations of the University of Michigan, The. H. A. GLEA- SON	411
Biology from the Pupils' Standpoint. GEORGE C. WOOD	804
Biology in the High Schools. HERBERT F. ROBERTS	146
Biology, Practical. GEORGE C. WOOD	240
Book Collections in American Libraries, Famous. U. S. BUREAU OF EDUCATION	586
Books Received	80, 178, 265, 263, 451, 547, 637, 742, 834
Book Reviews	82, 180, 266, 364, 452, 548, 638, 744, 838
Advanced Shop Mathematics. HERBERT E. COBB.....	748
Academic Algebra. HERBERT E. COBB	646
Achievements of Chemical Science. CHARLES H. SMITH	553
Advanced Algebra. HERBERT E. COBB.....	838
A First Course in Physics. CHARLES H. SMITH	548
Agricultural Education in the Public Schools. W. L. EIKENBERRY...	460
Agronomy. W. L. EIKENBERRY	552
A High School Algebra. HERBERT E. COBB	646
A History of Chemistry, from the Earliest Times Till the Present Day. CHARLES H. SMITH	453
A Laboratory Manual of Agriculture for Secondary Schools. W. L. EIKENBERRY	368
Alternating Currents Simplified. CHARLES H. SMITH	180
A Manual of Laboratory Exercises in Physics. CHARLES H. SMITH.	267
A Manual of Zoölogy. WORRALO WHITNEY	746
An Elementary Treatise on Calculus. HERBERT E. COBB	748
An Experimental Course in Alternating Currents for Vocational Work in Electricity. CHARLES H. SMITH	744
An Illustrated Flora of the Northern United States, Canada and British Possessions. W. L. EIKENBERRY.....	844

An Inductive Chemistry. CHARLES M. TURTON	86
Arithmetic by Practice. HERBERT E. COBB	645
A Text-Book of Inorganic Chemistry. CHARLES M. TURTON.....	748
A Text-Book of Mathematics and Mechanics. HERBERT E. COBB ..	549
A Text-Book of Physics. CHARLES H. SMITH	453
A Text-Book of Physics. CHARLES H. SMITH	840
Business Arithmetic for Secondary Schools. HERBERT E. COBB ...	554
Catalogue of High School and College Text-Books. CHARLES H. SMITH	645
Chemical Theory and Calculations. CHARLES H. SMITH	646
Chemistry and Its Relation to Daily Life. CHARLES H. SMITH.....	750
College Algebra. HERBERT E. COBB	643
College Zoology. WORRALO WHITNEY	458
Commercial Values, An Atlas of Raw Materials of Commerce and Commercial Interchanges. JAMES H. SMITH	641
Complete School Algebra. HERBERT E. COBB	267
Culture, Discipline and Democracy. CHARLES H. SMITH	550
Elementary Arithmetic. HERBERT E. COBB	82
Elementary Biology, Animal and Human. WORRALO WHITNEY ...	642
Elementary Book on the Calculus. HERBERT E. COBB.....	268
Elementary Electrical Testing and Practical Measuring Apparatus. CHARLES H. SMITH	840
Elementary Entomology. WORRALO WHITNEY	368
Elementary Experimental Chemistry. CHARLES M. TURTON	750
Elementary Principles of Electricity and Magnetism. CHARLES H. SMITH	553
Elementary Trigonometry. HERBERT E. COBB.....	364
Elements of Physics. CHARLES H. SMITH	554
Elements of Plane Trigonometry. HERBERT E. COBB.....	550
Essentials of Chemistry. CHARLES M. TURTON	366
Essentials of Electricity, Direct Currents. CHARLES H. SMITH	452
Essentials of Physics. CHARLES H. SMITH	452
Essentials of Physics for College Students. CHARLES H. SMITH ..	641
Everyday English. CHARLES H. SMITH	746
Experimental and Theoretical Geometry. HERBERT E. COBB	364
Field and Laboratory Guide Principles of Economic Zoology. WOR- RALO WHITNEY	366
First Year in Bookkeeping and Accounting. CHARLES H. SMITH ...	638
Foundations and Technic of Arithmetic. HERBERT E. COBB	267
Francis W. Parker School. CHARLES H. SMITH	645
Gas Analysis. CHARLES H. SMITH	644
Genetics, An Introduction to the Study of Heredity. CHARLES H. SMITH	456
Health in Home and Town. CHARLES H. SMITH	548
Heat, a Manual for Technical and Industrial Students. CHARLES H. SMITH	456
Higher Algebra. HERBERT E. COBB	549
High School Agriculture. W. L. EIKENBERRY.....	844
Household Bacteriology for Students in Domestic Science. WOR- RALO WHITNEY	640
Hygiene for the Worker. CHARLES H. SMITH	551
Hygiene for the Worker. WORRALO WHITNEY	639
Industrial Mathematics. CHARLES H. SMITH	552
Journal of the Proceedings of the Fiftieth Annual Meeting of the National Education Association. CHARLES H. SMITH	551
Junior Mathematics. HERBERT E. COBB	364
Laboratory Studies in Chemistry. CHARLES M. TURTON	86
Manual of Qualitative Analysis, Reagent and Combustion Methods. CHARLES M. TURTON	744

Microscopy and the Microscopical Examination of Drugs. WOR-	
RALO WHITNEY	460
Mineral Science, a Study of Inorganic Nature. CHAS. H. SMITH ...	453
Non-Euclidean Geometry. HERBERT E. COBB.....	268
Notes on Chemical Research. CHARLES H. SMITH	638
Outlines of Physiology. WORRALO WHITNEY	640
Physical Laboratory Guide. CHARLES H. SMITH	456
Plane and Solid Geometry. HERBERT E. COBB	88
Plane Geometry. HERBERT E. COBB.....	838
Plant and Animal Children. W. L. EIKENBERRY	842
Practical Chemistry for Engineering Students. CHARLES M. TURTON	748
Practical Geometry and Graphics. HERBERT E. COBB	266
Practical Geometry and Graphics for Technical Students. HERBERT	
E. COBB	643
Practical Mathematics. HERBERT E. COBB	180
Practical Mathematics. HERBERT E. COBB	364
Practical Mathematics, Part IV, Trigonometry and Logarithms.	
HERBERT E. COBB	640
Practical Physics for Secondary Schools. CHARLES H. SMITH	639
Principles of Economic Zoology. WORRALO WHITNEY	458
Review Questions and Problems in Chemistry. CHARLES H. SMITH .	549
School Algebra. HERBERT E. COBB	842
School and Home Gardens. W. L. EIKENBERRY	551
School Hygiene. CHARLES H. SMITH	644
Seventh Annual Report of the Carnegie Foundation for the Ad-	
vancement of Teaching. CHARLES H. SMITH	553
Shop Mathematics. HERBERT E. COBB	182
Solid Geometry, Developed by the Syllabus Method. HERBERT E.	
COBB	554
Source Book of Problems for Geometry. HERBERT E. COBB	266
Syllabus of Mathematics. HERBERT E. COBB	82
Teacher's Manual of Biology. WORRALO WHITNEY	642
Text-Book of Anatomy and Physiology for Nurses. WORRALO	
WHITNEY	642
The A B C of the Differential Calculus. HERBERT E. COBB.....	268
The Calculus. HERBERT E. COBB	84
The Development of the Human Body, a Manual of Human Em-	
bryology. WORRALO WHITNEY	641
The Electric Motor and Its Practical Operations. CHARLES H.	
SMITH	368
The Golden Deed Book, a School Reader. CHARLES H. SMITH.....	646
The Idea of the Industrial School. CHARLES H. SMITH	646
The Living Plant. W. L. EIKENBERRY	842
The Mammals of Illinois and Wisconsin. WORRALO WHITNEY.....	84
The Origin of Life. CHARLES H. SMITH	640
The Pupils' Arithmetic. HERBERT E. COBB	744
The Soil Solution. W. L. EIKENBERRY	460
The Teaching of Arithmetic. HERBERT E. COBB	842
The Teaching of Plane Geometry. HERBERT E. COBB	86
The Way to the Heart of the Pupil. CHARLES H. SMITH	645
Toys and Toymaking. CHARLES H. SMITH	182
Trigonometry. HERBERT E. COBB	838
Variations in the Grades of High School Pupils. CHARLES H. SMITH	750
Who's Who in Science. CHARLES H. SMITH	454
Boyle's Law, A Unique Demonstration of. ALBERT E. HENNINGS ...	226
Boyle's Law Apparatus, A Form of. SCHOOL WORLD	544
Bunsen Burner, A New	543
Bureau of Education Library	14

C

California High School Teachers Association, Mathematics Section of the.	829
Cambridge Botanical Supply Company	741
Central Association of Science and Mathematics Teachers, Annual Meeting of the. JAMES F. MILLER	734, 822
Charts Illustrating the Effects of Common Defects of the Eye. W. M. WINTON	153
Chemical Activities of Leaves, Experimental Study of the. R. R. TURNER	681
Chemistry for High School Girls. G. ROSS ROBERTSON	133
Chemistry in German. JESSIE COPLIN	667
Chemistry Section Announcement. H. R. SMITH	731
Chicago High Schools, Two New. C. H. S.	637
Cigaret the Culprit, Is the.	410
Circassian Walnut. U. S. DEPARTMENT OF AGRICULTURE	347
Coal Waste	117
Colds, Dangers of Common. JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION	264
Collateral Reading for High School Biology. T. W. GALLOWAY	706
Colloids. HARRY N. HOLMES	672, 765
Colloids and Crystals, the Two Worlds of Matter. ROBERT H. BRADBURY	563
* Coloring the Bunsen Flame, A Convenient Method of. RALPH S. MINOR	776
Compressed Air at Panama	326
Conveniences in a Country School, City. U. S. BUREAU OF EDUCATION	619
Converters of Plant Nourishment into Human Food, Animals as. JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION	663
Correction, A	836
Country School Teacher as a Public Health Educator, The. U. S. BUREAU OF EDUCATION	196
Crocker Land Expedition. SCIENCE	635

D

Doctors of Public Health. U. S. BUREAU OF EDUCATION	262
Drawing Exhibit for City School, Traveling. BUREAU OF EDUCATION	97
Duplication of the Cube, An Approximate Solution of the Problem of the. A. A. DMITROVSKY	311

E

Eastern Association of Physics Teachers. C. H. S.	533
Economics in the Course in Mathematics from the Standpoint of the High School. FRANK O. HESTER	751
Education Notes	161, 430, 832
Education Notes and Comments	630
Electric Heater in Efficiency Tests, The Use of the. ERNEST REVELEY SMITH	10
Elementary Physics Examination. P. W. DYSART	448
Elk and Buffalo in Yellowstone Park. DEPARTMENT OF THE INTERIOR ..	152
Errors in Mathematics. G. A. MILLER	313
Evolution of the High School Course in Agriculture. JOSIAH MAIN ..	508
Experiment Both Interesting and Instructive. An	298
Experiment for General Chemistry, A Quantitative. ROBERT W. CURTIS	37
Experiment for Showing Lines of Force in An Electrostatic Field, An. B. M. NEVILLE	624

Experiment to show the Physics of a Hammer Drawing a Nail. H. L. F. MORSE.....	416
---	-----

F

Factoring—A Dissertation on the Case ax^2+bx+c . JOHN M. GALLAGHER	798
Fourth International Congress on School Hygiene.....	547
Free Copies of Government Food and Diet Charts, No More.....	740

G

Gas and Electric Furnaces for Physics Laboratory Work. H. C. BELTZ	577
General History of the Central Association of Science and Mathematics Teachers, Brief. CHAS. H. SMITH.....	348
Generalization and Application of Theorems in Geometry. PHILIP FITCH	345
General Science. JOHN F. WOODHULL	499
Geology of Oil Little Understood. U. S. GEOLOGICAL SURVEY.....	583
Geometry Syllabus, Chicago. MABEL SYKES.....	587
German Prosperity. NICHOLAS KNIGHT.....	446
Glass Sand, Requisites of Good.....	264
Good Map Engravers Scarce. U. S. GEOLOGICAL SURVEY.....	542
Government Should have Jurisdiction in Glacier National Park. U. S. GEOLOGICAL SURVEY.....	450
Government Timber. FOREST SERVICE.....	434

H

Hampton Institute Work for Negroes.....	733
Hawaiian Schools.....	700
Heat of Fusion of Tin, The. C. W. WAGGONER.....	669
Heliostat for the Lecture Room, A. WILLIAM F. RIGGE.....	139
Highest and Lowest Points in the World. U. S. GEOLOGICAL SURVEY..	360
High School and College. U. S. BUREAU OF EDUCATION	705
High School and Railroad Co-operate.....	683
High School Chemistry, Meeting New Demands with. FOORD VON BICHOWSKY	772
High School Physics in the State of Indiana. EARL R. GLENN.....	483
High School Physics, The Teaching of. HERBERT BROWNELL.....	303
High School Science, Election in. PERCY E. ROWELL.....	422
History of Numbers, A Lesson from the. R. D. CARMICHAEL.....	392
History of the Biological Science Section of the Central Association. OTIS W. CALDWELL.....	350
Honesty in Public Health Work. JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION	263

I

Illuminating Gas. Standards for. BUREAU OF STANDARDS	775
Illustrated Lectures.....	778
Image Positions from Lenses. J. S. STEVENS.....	574
Incomes of State Colleges.....	821
Indiana State Science and Mathematics Association Meeting. ERNEST S. TILLMAN	256, 534
Individual Laboratory Work in Physics. ELMER J. WILSON	447
Induction Apparatus, An. C. F. ADAMS.....	232
Inductive Research into the Most Effective Methods of Teaching Mathematics, A First Step in. A. DUNCAN YOCUM.....	197
Iowa State Summer School.....	363

J

Joint Committee on Physics, The. J. A. RANDALL.....	501
---	-----

K

Kansas Association of Mathematics Teachers.....	255
---	-----

L

Laboratory Exercise, An Improved. CARL M. KIBLER.....	449
Laboratory Thermometer Scale, A. JEAN BROADHURST.....	68
Land Erosion Stupendous. U. S. GEOLOGICAL SURVEY.....	252
Large Coal Mines. U. S. GEOLOGICAL SURVEY.....	381
Lantern Slides.....	803

M

Magic Number Cards, The. R. M. MATHEWS	819
Magnetic Field of a Dynamo and the Effect of Armature Current on This Field, Demonstration of the. F. A. CLARK.....	655
Magnetic Potential and Force Fields and Its Application in the De- velopment of the Potential Concept, A New Method of Explor- ing. REINHARD A. WETZEL.....	220
Making High School Physics Real. F. F. GOOD.....	338
Mathematical and Physical Section of the Ontario Educational Asso- ciation. H. S. R.....	625
Mathematical History and Some Lessons, A Thread of. R. D. CAR- MICHAEL	684
Mathematical Instruction and the Professors of Mathematics in the French Lycées for Boys. R. C. ARCHIBALD	43, 105
Mathematical Laboratory.....	544
Mathematics Section of the California High School Teachers Asso- ciation	829
Minutes of Biology Section of Central Association. ADA L. WECKEL	168
Minutes of Chemistry Section of Central Association. HERBERT R. SMITH	170
Minutes of the Earth Science Section of Central Association. BERTHA HENDERSON	172
Minutes of the Mathematics of the Central Association. E. MARIE GUGLE	174
Minutes of the Physics Section of the Central Association. E. P. REYNOLDS	259
Models for Teaching Solid Geometry. SCHOOL WORLD	210
Moderate Drinking. The Taboo on. JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.....	77
Motion Pictures in Schools. SARA L. LEVIER	623
Moving Pictures in German Education.....	797

N

National Education Association. CHAS. H. SMITH.....	79
New York State Science Teachers Annual Meeting	823
New York State Science Teachers Association. BRYAN O. BURGIN ...	256

O

Open Book Tests. A. P. ANDREWS.....	255
Oscillations from the Electric Arc. CHARLES F. BOWEN.....	492

P

Pacific Coast Association of Physics and Chemistry Teachers.....	735
Pedagogy in Trigonometry. ARTHUR LATHAM BAKER.....	118
Pedagogy in Trigonometry, Notes on. A. L. BAKER.....	352
Perpetual Motion in Elementary Physics, The Negation of. WILSON C. MORRIS	469

Personals	628
Philippine Sulphur	479
Physical Theory, Some Recent. ALBERT P. CARMAN.....	1
Physics Club of New York.....	533
Physics from the Girl's Point of View. ADELE CAZIN.....	333
Physiographic Material, Some Suggestions Concerning Easily Ob- tained. BERNICE L. HAUG.....	427
Pikes Peak not the Highest. U. S. GEOLOGICAL SURVEY.....	381
Planetary Distances. C. E. WHITE.....	545
Planetary Winds and Distribution of Rainfall; a Deductive Study. R. R. TURNER.....	668
Plant and Animal Studies in a Science Program for Secondary Schools, The Place of. JOHN G. COULTER.....	740
Plants, The Effects of Advancing Civilization Upon. WM. CROCKER...	277
Platinum Has Many Uses. U. S. GEOLOGICAL SURVEY.....	80
Preparation of Earthworms and Smaller Oligochaetes for Study, A Method for the. PAUL S. WELCH.....	75
Present Teaching of Physics Be Guided by Vocational Work, To What Extent Shall Our. PHILO F. HAMMOND.....	758
Price of Government Maps Increases. U. S. GEOLOGICAL SURVEY.....	163
Problem Department. E. L. BROWN 69, 157, 248, 355, 435, 525, 611, 726, 824	
Projectile, Note on a Device to Illustrate the Path of a. J. H. C. BAGBY	224
Projection of the Guinea and the Feather Experiment, The. A. P. CARMAN	421
Psychology of Errors in Elementary Mathematics, On the. THOMAS J. McCORMACK	121, 211
Publications of the Central Committee and the National Sub-Commis- sion, List of	713
Pythagorean Theorem, A Proof of the. HENRY HARTIG.....	819

R

Rational Plane Triangles Whose Sides Are Whole Numbers, Some Properties of. ARTEMAS MARTIN.....	320
Realness in Science Teaching. W. C. RUEDIGER.....	461
Re-Enforcement for Topographic Maps, A Cheap and Convenient. S. S. VISHER.....	542
Re-Introduction of Arithmetic into the High School Course, The. HARRISON E. WEBB.....	517
Relation of First Year Science to Courses in Agriculture, The. CHARLES A. SHULL	601
Report of Committee on Practical Chemistry to New York State Science Teachers Association. JOHN F. WOODHULL	294
Roads in Crater Lake National Park. DEPARTMENT OF THE INTERIOR...	538
Rock Analyses, Some. NICHOLAS KNIGHT.....	664
Rock from Solomon's Quarries, The. NICHOLAS KNIGHT.....	573
Rule of Bioche and Its Application to the Solution of Trigonometric Equations, The. A. BABBITT.....	480

S

Salaries of City School Superintendents. U. S. BUREAU OF EDUCATION 164	
Sassafras, White. AMERICAN BOTANIST	764
School Diseases. JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION...	362
School Farming in Alaska. U. S. BUREAU OF EDUCATION	429
School for the Discontented, A. U. S. BUREAU OF EDUCATION.....	712
School Grades, The Statistical Investigation of. W. L. EIKENBERRY...	27
School Social Centers.....	359
Schooling in the Country, For Nine Months of. P. P. CLAXTON.....	572

Schools as Employment Bureaus. U. S. BUREAU OF EDUCATION.....	450
Schools Urged to Use Topographic Maps. U. S. GEOLOGICAL SURVEY	541
Science and Agriculture in the High School, Sequence of. JOSIAH MAIN	695
Science and Mathematics Societies. CHAS. H. SMITH.....	270, 556
Science and Mathematics Societies.....	648
Science in the High School, An Investigation. WARRALO WHITNEY...	183
Science Questions. FRANKLIN T. JONES.....	74, 253, 361, 440, 530, 616, 815
Science Teaching, An Experiment in. FLOYD L. DARROW	701
Scientific Work, Based on.....	821
Secondary Vocational Mathematics, Organization of Courses in. W. T. STRATTON	779
Spectacles, The Earliest Known Pair of. JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION	18
Southern California Science and Mathematics Association. FRANK G. REID	625
Swiss Schools. U. S. BUREAU OF EDUCATION.....	399

T

Teachers Needed in Chicago.....	360, 410
Teaching Mathematics, A First Step in Inductive Research into the Most Effective Methods of. A DUNCAN YOCUM.....	197
Teaching of Geometry at Tuskegee, The. D. W. WOODARD.....	400
Teleological Explanation, The Passing of the. EDGAR N. TRANSEAU..	369
The Banana—A Fruit in a Sterile Package. JOURNAL OF THE AMER- ICAN MEDICAL ASSOCIATION	391
Tides, An Elementary Exposition of the. EDISON PETTIT	57, 98
Topographic Maps for Use in High Schools, A New List of. W. H. NORTON	236
Trachoma	600
Traveling Hospital for Rural Needs, A. JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION	468
Traveling University, A.....	78
Trick with Cards, A. R. M. MATHEWS.....	820
Trisection of an Angle by Means of a Graduated Ruler and Compass, The. CLARENCE OHLENDORF	546
Turpentine. U. S. DEPARTMENT OF AGRICULTURE	415
Twelfth Annual Meeting of the Central Association of Science and Mathematics Teachers. C. E. SPICER	165

U

Uniformity in Grading Students, A Study of an Attempt at. ELLIOT R. DOWNING	290
--	-----

V

Vocational Guidance and the Teacher of Science. W. C. BAGLEY.....	89
---	----

W

Wanted—Old Textbooks. BUREAU OF EDUCATION.....	79
Wave-Length Meter, A New Color. REINHARD A. WETZEL	19
Winds: An Inductive Study, The Course of. R. R. TURNER.....	599
Wireless Outfit, An Inexpensive. H. CLYDE KRENERICK	301
Women in the Public Schools. U. S. BUREAU OF EDUCATION.....	532
Work for Money but Stay in School.....	332

Y

Yosemite National Park, Private Lands in. DEPARTMENT OF THE IN- TERIOR	132
---	-----

INDEX BY AUTHORS.

A

ADAMS, C. F. Central High School, Detroit.....	232
AMERICAN BOTANIST	764
ANDREWS, A. P. Central High School, Minneapolis.....	255
ARCHIBALD, R. A. Brown University.....	43, 105

B

BABBITT, A. Pennsylvania State College.....	480
BAGLEY, J. H. C. Hampden-Sidney College, Virginia.....	224
BAGLEY, W. C. University of Illinois.....	89
BAKER, ARTHUR LATHAM. Manual Training High School, Brooklyn	118, 352
BELTZ, H. C. Pratt Institute.....	577
BOWEN, CHARLES F. Manchester, N. H.....	492
BRADBURY, ROBERT H. Southern High School, Philadelphia.....	563
BROADHURST, JEAN. Teachers College, New York City.....	68
BROWN, E. L. North Side High School, Denver.....	69, 157, 248, 355, 435, 525, 611, 726, 824
BROWNELL, HERBERT. Teachers College, University of Nebraska.....	303
BUREAU OF EDUCATION. Washington, D. C.....	14, 79, 97, 156, 164, 196, 262, 359, 399, 429, 450, 500, 532
BUREAU OF STANDARDS.....	775
BURGIN, BRYAN O. High School, Albany	256

C

CALDWELL, OTIS W. University of Chicago.....	350
CARMAN, ALBERT P. University of Illinois.....	1, 421
CARMICHAEL, R. D. Indiana University.....	392, 684
CAZIN, ADELE. State Normal School, Montclair, N. J.....	333
CLARK, F. A. Pratt Institute.....	657
COBB, HERBERT E. Lewis Institute, Chicago.....	82, 84, 85, 88, 180, 182, 266, 267, 268, 364, 549, 550, 554, 640, 643, 645, 646, 744, 748, 838, 840, 842
COPLIN, JESSIE. Minneapolis.....	667
COULTER, JOHN G. Bloomington, Ill.....	740
CROCKER, WM. University of Chicago.....	277
CURTIS, ROBERT W. College of the City of New York.....	37

D

DARROW, FLOYD L. Polytechnic Preparatory School, Brooklyn.....	701
DEPARTMENT OF AGRICULTURE. Washington, D. C.....	347, 415
DEPARTMENT OF THE INTERIOR. Washington, D. C.....	132, 152, 450, 538
DMITROVSKY, A. A. University of Moscow, Russia.....	311
DOWNING, ELLIOT R. School of Education, University of Chicago.....	290
DYSART, P. W. High School, Pittsburgh.....	448

E

EDINBURGH UNIVERSITY	544
EIKENBERRY, W. L. University High School, University of Chicago	27, 368, 460, 551, 552, 842, 844

F

FISKE, WINTHROP E. Phillips Exeter Academy.....	419
FITCH, PHILIP. Denver, Colorado.....	345

G

GALLAGHER, JOHN M. High School of Commerce, Boston.....	798
---	-----

GALLOWAY, T. W. James Millikin University, Decatur, Ill.....	706
GLEASON, H. A. University of Michigan.....	411
GLENN, EARL R. High School, Bloomington, Ind.....	483
GOOD, F. F. Columbia University.....	338
GOULD, J. E.....	327
GUGLE, E. MARIE.....	174

H

HAILMAN, W. N. Normal School, Cleveland.....	382
HALL, C. M. Central High School, Springfield, Mass.....	735
HALSTED, GEORGE BRUCE. Greely, Colorado	344
HAMMOND, PHILO F. Palo Alto, Cal.....	758
HARTIG, HENRY. North High School, Minneapolis.....	819
HAUG, BERNICE L. Detroit Central High School.....	427
HAYNES, ARTHUR E.	584
HEDRICK, WM. A. McKinley High School, Washington.....	627
HENNINGS, ALBERT E. University of Chicago.....	226
HENDERSON, BERTHA	172
HESTER, FRANK O. Lane Technical High School, Chicago	751
HOLMES, HARRY N. Earlham College, Richmond, Ind.....	672, 765

J

JONES, FRANKLIN T. University School, Cleveland.....	74, 253, 361, 440, 530, 616, 815
JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.....	18, 77, 104, 263, 264, 362, 391, 468, 636, 663, 822

K

KIBLER, CARL M. High School, Petersburg, Ill.....	449
KNIGHT, NICHOLAS. Cornell College, Mount Vernon, Iowa.....	446, 573, 664, 733
KNIIRK, CARL F. West Technical High School, Cleveland.....	306
KRENERICK, H. CLYDE. North Division High School, Milwaukee.....	301

L

LEVIER, MISS SARA L.	623
---------------------------	-----

M

MAIN, JOSIAH. Hays, Kansas.....	508, 695
MARTIN, ARTEMAS. Washington, D. C.....	320, 793
MATHEWS, R. M. Riverside, California.....	819, 820
MCCORMACK, THOMAS J. La Salle, Illinois.....	121, 211
MULLER, G. A. University of Illinois.....	313
MULLIS, JAMES R. Francis W. Parker School, Chicago.....	735
MENOR, RALPH S. University of California.....	776
MORRIS, WILSON C. Normal School, Warrensburg, Mo.....	469
MORSE, H. L. F. Troy, N. Y.....	416

N

NGRTON, W. H. Cornell College, Mt. Vernon, Iowa.....	236
--	-----

O

OHLENDORF, CLARENCE. Park Ridge, Ill.....	546
---	-----

P

PETTIT, EDISON. High School, Minden, Neb.	57, 98
--	--------

R

RANDALL, J. A. Pratt Institute, Brooklyn.....	501
---	-----

RAMLER, OTTO J. Canisius College, Buffalo.....	346
REYNOLDS, E. P.....	258
REID, FRANK G.....	626
RIGGE, WILLIAM F. Creighton University, Omaha, Neb.....	139
ROBERTS, HERBERT F. Kansas State Agricultural College.....	146
ROBERTSON, G. ROSS. Polytechnic High School, Riverside, Cal.....	133
ROWELL, PERCY E. Berkeley, Cal.....	422
RUEDIGER, W. C. George Washington University, Washington, D. C....	461

S

SCHOOL WORLD. London, England.....	210, 544
SCIENCE. Garrison, N. Y.....	635
SHULL, CHARLES A. University of Kansas.....	601
SLAUGHT, H. E. University of Chicago.....	67
SMITH, CHARLES H. Hyde Park High School, Chicago.....	
.....66, 80, 155, 178, 180,	
182, 260, 265, 267, 270, 348, 353, 363, 368, 443, 451, 452, 453, 454, 456,	
533, 539, 547, 548, 549, 550, 551, 552, 553, 554, 556, 620, 628, 630, 637,	
640, 641, 644, 645, 646, 648, 737, 741, 742, 744, 746, 750, 830, 834, 836, 840	
SMITH, ERNEST REVELEY. North High School, Syracuse.....	10
SMITH, H. R. Lake View, Chicago High School.....	170, 731
SMITH, JAMES H. Austin, Chicago High School.....	641
SPICER, C. E. High School, Joliet, Illinois.....	165
STEVENS, J. S. University of Maine.....	574
STRATTON, W. T. Kansas Agricultural College.....	779
SYKES, MABEL. Bowen High School, Chicago.....	587

T

TILLMAN, ERNEST S. High School, Hammond, Ind.....	534
TRANSEAU, EDGAR N. Normal School, Charleston, Illinois.....	369
TURNER, R. R. University of Illinois.....	599, 668
TURTON, CHARLES M. Bowen High School, Chicago.....	
.....86, 366, 744, 748, 750	

U

UNITED STATES BUREAU OF EDUCATION.....	586, 619, 700, 705, 712, 821, 823
UNITED STATES GEOLOGICAL SURVEY.....	80, 163, 360, 541, 542

V

VISHER, S. S. University of South Dakota.....	542
---	-----

W

WAGGONER, C. W. West Virginia University.....	669
WEBB, HARRISON E. Manual Training High School, Newark, N. J....	517
WECKEL, ADA L.....	170
WELCH, PAUL S. University of Illinois.....	15
WETZEL, REINHARD A. College of the City of New York.....	10, 220
WHITE, C. E. West Virginia Wesleyan College, Buckhannon.....	545
WHITNEY, WORRALO. Hyde Park High School, Chicago.....	
.....84, 183, 366, 368, 458, 460, 640, 642, 644, 746	
WILSON, ELMER J. High School, Fond du Lac, Wisconsin.....	447
WINTON, W. M. Agricultural and Mechanical College of Texas.....	153
WOODARD, D. W. Tuskegee Normal and Industrial Institute.....	400
WOOD, GEORGE C. Boys' High School, Brooklyn.....	240, 802
WOODHULL, JOHN F. Teachers College, Columbia University.....	294, 499

Y

YOCUM, A. DUNCAN. University of Pennsylvania.....	197
---	-----